

✓ STS-113

*3054167

SPC 1020

NOV 11 02

PROCESSING OPERATIONS CONTROL OMI PLANNING SHEET



Wad Number S6444-J04-R02	SITE LCC	Elem CD V	End Item 105 FLT: 019	DATE: 11/10/2002 TIME: 22:17:28
-----------------------------	-------------	--------------	--------------------------	------------------------------------

Title: SSV ICE AND DEBRIS ASSESSMENT	Sub Element/Zone 30
---	------------------------

Project Work Order No.	Hazard: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SFOC Safety NA	<input type="checkbox"/> Local Copy <input checked="" type="checkbox"/> Firing Room Copy
------------------------	--	-------------------	---

Authorizing Document VPL519	Material & Equipment: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	MICR Req'd <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	OMRS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
--------------------------------	--	---	--

PERFORM THE FOLLOWING:

Pre-Ops Setups

Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps
CVAS	USA VM 057			TIPS	USA VM 033		
					USA VM 068		
				TACCS	USA VM 044		

OPS Support

Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps
------	------------------	-----	-------	------	------------------	-----	-------

Operating Instructions

Task	Seq	Steps	Task	Seq	Steps
	010			080	
	015			090	
	020			100	
	030			110	
	040			120	
	050			130	
	060			140	
	070			150	

Post Ops

Task	Operation Number	Seq	Steps
------	------------------	-----	-------

Appendices

Task	Seq
N/A	







Subtask WAD's

N/A

OMI TASK CLOSEOUT CHECKLIST

SPC 764

DEC 4 02

OMI No. <i>56444 J04</i>	Run No. <i>2</i>	Task Control No. (TCN) <i>3054167</i>
Start Date <i>11-25-02</i>	Completion Date <i>11-25-02</i>	Closure Date  DEC 4 02
1. Deviation Index: Verify total number of deviations agree with index. Verify entry is correct into OMI.		QC/Eng.  DEC 4 02
2. Constraints: Verify all constraints are cleared. <i>SUB OF 50007</i>		NA NA
3. IPR's: Verify that all IPR's are closed or upgraded to problem reports or dispositioned as no constraint to OMI closure and incorporated in central IPR system and a copy of the central IPR sort attached.		 DEC 4 02
4. Verify that material and equipment requirement list enclosed (if applicable).		NA NA
5. OMI: Verify that all pages or verification sheets are completed, stamped, and dated in the lower left/right hand corners.		 DEC 4 02
6. OMI: Verify that all miscellaneous documents/procedures have sequence number referenced and stamped; e.g., photos, sample results, etc.		 DEC 4 02
7. Planned task/OMI satisfactorily completed. OPR: <i>R Brewer</i> <i>11-27-02</i>		 DEC 4 02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
10:00 AM
J04

SSV ICE AND DEBRIS ASSESSMENT

Element/End Item: ALL
Flow/Usage: ET-103 & SUBS
Facility: LC 39
Design Center Concurrence: MSFC,JSC
Category: B
OPR: ETM
TTL ORG: SE

**This document contains
HAZARDOUS operations.**

Table of Contents:

1.0 INFORMATION.....	1
1.1 Objective.....	1
1.2 Special Instructions All Operations.....	2
1.3 Operations List	4
2.0 SAFETY INFORMATION.....	5
2.1 Hazards	5
2.2 Safety Requirements.....	5
2.4 Reference Safety Documentation	5
3.0 STAGING REQUIREMENTS.....	6
3.1 Referenced Engineering Documentation.....	6
3.1.2 Documents (Auto Build Section).....	6
3.1 Referenced Engineering Documentation.....	6
3.1.2 Documents.....	6
3.2 Parts, Materials, Equipment, and Special Tools.....	6
3.2.5 Shop Support Materials.....	6
3.2.8 Personal Protective Equipment	7
4.0 PLANNING REQUIREMENTS	8
4.3 LPS Requirements	8
4.3.1 Computer Systems.....	8
4.4 Support Services, Commodities, and Equipment.....	8
4.4.2 Communications.....	8
4.4.3 OTV.....	8
4.4.4 Countdown Display/Status.....	9
4.4.8 Services	Error! Bookmark not defined.
4.4.12 Propellants, Gases and Chemicals.....	9
5.0 CONFIGURATION ACCOUNTING AND VERIFICATION.....	10
5.1 Specific OMRS Requirements Satisfied by this TOP	10
5.5 List of References	11

1.0 INFORMATION

1.1 Objective

Provide necessary tasks that document, monitor and evaluate ice and debris conditions to eliminate or minimize debris concerns of the integrated SSV during ET tanking, FRF, launch, and associated detanking.

Description

1. This OMI is performed as subtask to S0007/S0014/S0037.
2. This OMI provides documentation of ice/debris activities:
 - A. Pre-launch icing briefing
 - B. Pre-launch debris inspection
 - C. Countdown - Based timeline evaluation monitoring of ET TPS surfaces using OTV
 - D. OTV monitoring of seal/flange areas for cryogenic leakage
 - E. SSV OTV monitoring for debris conditions during countdown
 - F. Cryogenic replenish inspection for evaluation of SSV and facility debris concerns or anomalies
 - G. Evaluation of concerns/anomalies in the event of ET detanking
 - H. Review of engineering film data for SSME ignition, launch, ascent, ET separation, and orbiter landing.
3. Orbiter landing debris information is contained in the NASA publication for Ice and Debris Assessment. That report is referenced in this OMI for continuity of debris data.

1.2 Special Instructions All Operations

1. This OMI is run as a subtask to OMI's S0007, S0014, and S0037. All PAD clearing and controlled access operations will be performed per those OMI's.
2. Constraints will be statused by controlling OMI's S0007/S0014/S0037.
3. The OTV camera numbering scheme for PAD A/B is 0XX/1XX.
4. Task Team Leader assignment: NASA PH-H is TTL for L-20 Hour Walkdown, Final Inspection, and Post Launch/Drain Walkdown. ETM is TTL for all other operations.
5. From time stable replenish mode starts until start of final SCAN, scanning with individual cameras should be performed approximately once per hour.
6. Cameras 061/161, 063/163, and 070/170 may be released to NASA select with CICE concurrence.
7. All personnel participating in final inspection and post drain walkdown shall be current in following training:
 - A. Emergency PAD egress
 - B. Fire fighting
 - C. ELSA
8. Milestones:
 - A. MLP portion of post launch walkdown commences at approximately T + 1 hours.
 - B. PAD acreage portion of the post launch walkdown commences at approximately T + 2 hours. (may be deferred until preferred daylight hours.)
 - C. Post drain walkdown commences at approximately T + 4 hours after drain initiated (typically 1 1/2 hours after LH₂/LO₂ low level sensors dry).
9. Hands-on investigation required for all ET-TPS defects suspected of violating NSTS 08303 ice/debris inspection criteria.
10. From time launch scrub is declared until 1.5 hours past time LH₂/LO₂ low level sensors read dry, OTV camera scanning shall be performed approximately once per hour.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
10:00

11. OTV cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171 shall be used to monitor LO₂/LH₂ tank drain operations.
12. Excessive vapors are defined as being more severe than that described in NSTS 08303 - Ice/Debris Inspection Criteria or NSTS 16007 - Launch Commit Criteria - Hazardous Gas Subsystem.
13. Quality coverage is not required for performance of this OMI. Ref SFOC-GO0007, Ice and Debris Team Operations are exempt from quality coverage. The ROR (CTIF) performs the CMQC function for all non-hazardous operations.
14. Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in the bayonet fitting and the lithium button battery door is securely locked and taped in place.
15. Verify camera flash is deactivated.
16. Personnel using Kodak DC 50/120 camera shall verify alkaline batteries are properly installed.
17. Personnel using digital cameras shall not operate in H₂ leak or O₂ rich environment (23 percent or greater).
18. Personnel using the Sony MVC-FD91 camera shall verify the lithium ion battery is securely locked and the battery door is locked closed. Personnel shall verify that both battery doors (lithium ion and lithium button) are closed and taped shut.
19. Personnel shall verify that cameras and equipment are securely tethered when at the PAD while the SSV is present.

1.3 Operations List

Operation		Shop/ Cntl Rm Console	OPR	Haz (Y/N)	Duration (Hrs)
No.	Title				
10	Support Preparations	STM/ FR2	ETM	N	0.2
15	IR Camera Setup	PH-H/ NA	ETM	N	4.0
20	Ice Prediction Briefing	SE/ NA	ETM	N	0.5
30	Pre-launch Walkdown	SE/ NA	ETM	N	2.0
40	Ice Frost Debris Console Initial Configuration Setup	SE/ FR2	ETM	N	3.0
50	SSV Debris Assessment	SE/ FR2	ETM	N	18.0
60	Group 1 Monitoring LO2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
70	Group 2 Monitoring - LH2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
80	Final Inspection	SE/ FR2	ETM	Y	3.0
90	LO2/LH2 Drain Monitoring	SE/ FR2	ETM	N	4.0
100	Console Securing	SE/ FR2	ETM	N	0.5
110	Summary Tape	SE/ FR2	ETM	N	18.0
120	Post Drain Walkdown	SE/ NA	ETM	Y	2.0
130	Post Launch Walkdown	SE/ NA	ETM	Y	3.0
140	Film Review	SE/ NA	ETM	N	15.0
145	IR Camera Removal	PH-H/ NA	ETM	N	2.0
150	Final Report	SE/ NA	ETM	N	0.5

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
14:00:00

2.0 SAFETY INFORMATION

2.1 Hazards

Operation

1. Working at unprotected heights.
2. Walkdown at PAD while SSV is in stable replenish mode.

2.2 Safety Requirements

Operation

1. If lightning activity is forecast to be within 5 miles of launch PAD, CTC and SFOC safety shall implement provisions of adverse/severe weather and lightning policy contained in GSOP 5400 Ground Safety Operations Procedures.
2. There are no safing/shutdown or evacuation steps required in this OMI.
3. Hazardous operations within this subtask OMI will not be started until safety concurrence to proceed has been given per the integrated OMI controlling this subtask.

2.4 Reference Safety Documentation

Number	Rev	Title
KHB 1710.2	LI	KSC Safety Practices Handbook
GSOP 5400	LI	Ground Safety Operating Procedures

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

3.0 STAGING REQUIREMENTS

3.1 Referenced Engineering Documentation

3.1.2 Documents (Auto Build Section)

3.1 Referenced Engineering Documentation

3.1.2 Documents

OPERATION 120

Document No.	Rev	Title
NSTS 08303	(LI)	NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA

3.2 Parts, Materials, Equipment, and Special Tools

3.2.5 Shop Support Materials

OPERATION 15

Part No./Find No.	Nomenclature	Qty	Unit
8305-00-519-3144	Rymple cloth	2	roll
6810-00-543-7915	Isopropyl alcohol	8	ounces

OPERATION 145

Part No./Find No.	Nomenclature	Qty	Unit
8305-00-519-3144	Rymple cloth	2	roll
6810-00-543-7915	Isopropyl alcohol	8	ounces
6505-00-133-8025	Petroleum Jelly, Vaseline (or equivalent)	1	tube/jar

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

3.2.8 Personal Protective Equipment

OPERATION 15	Nomenclature N-Dex nitril gloves chemical splash goggles face shield
OPERATION 30	Nomenclature safety harness lanyard
OPERATION 80	Nomenclature safety harness lanyard Nomex coveralls with gloves and hoods ELSA
OPERATION 120	Nomenclature safety harness lanyard hardhats flame retardant coveralls
OPERATION 130	Nomenclature safety harness lanyard hardhats flame retardant coveralls
OPERATION 145	Nomenclature N-Dex nitril gloves chemical splash goggles face shield

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

4.0 PLANNING REQUIREMENTS

OIR Required Yes [], No [X]

4.3 LPS Requirements

4.3.1 Computer Systems

PC GOAL
CCMS Configuration
CDS
CMS

4.4 Support Services, Commodities, and Equipment

4.4.2 Communications

(Per controlling OMI S0007, S0014 or S0037 unless specified otherwise)

4.4.3 OTV

(Per controlling OMI S0007, S0014 or S0037 unless specified otherwise)

OTV Cameras required: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

OTV Cameras to be recorded: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
03-15-2002

4.4.4 Countdown Display/Status

<u>Display Required</u>	<u>Bldg</u>	<u>Room</u>	<u>Operation Time</u>
Timing	LCC	FR2	Duration of Test
Countdown and GMT	LCC	FR2	Duration of Test

4.4.8 Services

<u>SGS Organization</u>	<u>Operation/Step</u>
LS	10-2

<u>COMM Organization</u>	<u>Operation/Step</u>
COMM	10-1
COMM	50-6
COMM	60-1
COMM	60-3
COMM	60-6
COMM	60-9
COMM	60-11
COMM	70-1
COMM	70-3
COMM	70-6
COMM	70-9
COMM	70-10
COMM	70-11
COMM	90-2
COMM	90-4
COMM	100-2

4.4.12 Propellants, Gases and Chemicals

<u>Commodity</u>	<u>Spec No.</u>	<u>Quantity</u>	<u>Rev</u>	<u>Location</u>	<u>Minimum Press</u>	<u>Delivery Time</u>
GN ₂	SES-0073 -6.3-5	Min 750 Cu ft	PH-H 861-3645	Pad 39B Camera Site 2	3000 PSI	1 week prior to T-0

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

5.0 CONFIGURATION ACCOUNTING AND VERIFICATION

5.1 Specific OMRS Requirements Satisfied by this TOP

OMRS NO.	NOMENCLATURE/ EFFECTIVITY	SEQ-STEP (CAP)
S00E00.021	ET TPS MON DURING DETANK	90-005
L01	TAF;C	
S00E00.031	POST DETANK ET TPS INSPECT	120-002
L01	TAF;C	
SC0FA0.900	PRELAUNCH WEATHER BRIEFING (L-1 DAY)	20-001
L01	VAF1-90	
S00FB0.005	ET TPS SURFACE MONITORING	50-024
(1)	L01 T23,27-29,31-999	
S00FB0.350	MONITOR GO2 VENT HOOD	50-026
(1)	L01 VAF1-90	
S00FB0.360	MONITOR ET/ORB MPS FOR LEAKAGE	50-024
(1)	L01 VAF1-90	
S00L00.150	HIGH WIND ET NOSE INSPECTION	50-022
L01	SAF;C	
S00U00.010	POST LAUNCH SHUTTLE/PAD AREA INSPECTION	130-002
(1)	L01 SAF1-999	
S00U00.011	ENGR REVIEW & ANALYSIS OF LAUNCH FILM	140-001
(1)	L01 SAF1-999	
S00U00.020-A	ENGINEERING PAD INSPECTION	80-002
(1)	L01 SAF1-999	
S00U00.020-C	INSPECT ORBITER AFT ENGINE	80-002
(1)	L01 SAF1-999	
S00U00.020-D	INFRARED SURVEILLANCE	80-002
(1)	L01 SAF1-999	
S00U00.030	PRELAUNCH SHUTTLE/PAD AREA INSPECTION	30-001
(1)	L01 SAF1-999	

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
APPROVED

5.5 List of References

OPERATION 20

Reference No.	Rev
NSTS 16007	(LI)

Title

NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F

OPERATION 30

Reference No.	Rev
80901019010	(LI)

Title

ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

OPERATION 40

Reference No.	Rev
79K24576	(LI)
79K24522	(LI)

Title

OTV System Installation, LC 39, Pad A
OTV System Installation, LC 39, Pad B

OPERATION 50

Reference No.	Rev
SPI SP-519	(LI)
SFOC GO0007	(LI)

Title

OMI and OM Implementation
Quality Planning Requirements Document (QPRD)

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SECRET
NOFORN

OPERATION 10 Support Preparations

Shop: STM

Cntrl Rm Console: FR2

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 0.2

10-1 STM JYVO 138

Verify PAD OTV system is configured to support S6444 as scheduled. ✓

Support: COMM

10-2 STM JSTC 111
JSTC *SCB 114

Verify eight 10-minute ELSA's available at complex J for use by Final Inspection Team (ref S0007/S0014/S0037). ✓

Support: LS

10-3 STM TBC 136

Operation - Support Preparations complete. ✓

*** End of Operation 10 ***

11-25-00
10-1

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

OPERATION 15 IR Camera Setup

Shop: PH-H
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

WARNING

Hard hats required on the Pad when SSV is not present.

CAUTION

Exercise care to avoid dropping equipment, fasteners, etc from RSS Roof to prevent damage to equipment or injury to personnel. All tools must be tethered.

NOTE

IR Camera installation at RSS Roof site may be not performed if IR Camera already installed or if technical concerns preclude such.

15-1 Install IR camera at RSS Roof Site as follows.

1. **Rotate** camera housing back cover to open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing fasteners (2 pl). **Reinstall** fasteners after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by locking spring pin at lower, left.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow opened back cover to exert undue force on cables once cables have been connected.

4. **Connect:**
 - OTV coaxial cable
 - Pan & tilt cable
 - Controller cable
 - Power cable
5. **Rotate** camera housing back cover into closed position. **Secure** back cover by installing bolts/flat washers (20 pl). **Tighten** bolts wrench tight.

11-25-02
ET 05

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SECRET

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 05-22-01

6. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol.
7. Perform functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.

Sub Step Not Performed:

ET
05

11-10-02

NASA PH-H _____ Date _____

USA ETM _____ Date _____

Not Performed:

ET
05

11-10-02

11-25-0
ET/01

NOTE

IR Camera installation at Camera Site 2 may be not performed if IR Camera already installed or if technical concerns preclude such.

15-2 Install IR camera at Camera Site 2 as follows.

1. **Rotate** camera housing back cover to open position by removing eight ea bolts using Phillips screwdriver. **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing securing bolt(s). **Reinstall** bolt(s) after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by tightening set screw(s) wrench tight at lower left/right.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

4. **Connect:**
 - OTV coaxial cable
 - Pan & tilt cable
 - Controller cable (2 pl)
 - Power cable
5. **Rotate** camera housing back cover into closed position. **Secure** back cover by installing bolts (8 pl). **Tighten** bolts using Phillips screwdriver.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 05-22-01

6. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol.
7. Perform functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.

Sub Step Not Performed:

ET/05

11-10-02

NASA PH-H _____ Date _____

USA ETM _____ Date _____

Not Performed:

ET/05

11-10-02

*** End of Operation 15 ***

ET/05



E. Cary Ralston
Vice President and
RSRM Program Manager

ATK Thiokol Propulsion
P.O. Box 707, M/S E00
Brigham City, UT 84302-0707

Tel 435 863-2258
Fax 435 863-8755
cary.ralston@atk.com

STEARNS, 2236

November 21, 2002
E600-CY02-410

George C. Marshall Space Flight Center
National Aeronautics & Space Administration
Marshall Space Flight Center, AL 35812

Attention Mr. M. U. Rudolph, MP51

Gentlemen:

Subject: RSRM-86/STS-113 Transmittal of L-24 Hour PMBT Prediction

This letter officially transmits the L-24 hour propellant mean bulk temperature (PMBT) predicted for STS-113, scheduled for launch on November 22, 2002. The PMBT at the time of launch is predicted to be 72°F which is within the 44° to 86°F requirement. This PMBT prediction is also valid for November 23, 2002.

Very truly yours,

E. Cary Ralston
E. C. Ralston

ECR:JBE/mp

cc: T. Boardman, L00
J. Burn, LD0
S. Eden, E68
J. Endicott, E68
K. Foulger, E62
S. Henderson, LF0
M. Kahn, A10
C. Ralston, E00
R. Roth, Thiokol/MSFC
D. Ruddell, E68

D. Burton, K68
S. Cash, MP51
T. Shaffner, Thiokol/KSC
B. St. Aubin, Thiokol/KSC
P. Teehan, KSC-SK
D. Wood, MP51

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

OPERATION 20 Ice Prediction Briefing

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F defines the ET No-Ice Zone.

20-1 CICE

Conduct L-1 day ice prediction briefing with launch director.

PH-H Signature

Armando Oliu 11/25/02
ARMANDO OLiu

OMRSD S00FA0.900

USA
141

20-2 Operation - Ice Prediction Briefing complete.

*** End of Operation 20 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SPRARS, 110

OPERATION 30 Pre-launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD
Hazard (Y/N): N
Duration (Hrs): 2.0

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

NOTE

This operation is performed at approximately L-20 hours. When this operation is performed in support of a 24 hour scrub turnaround, the preceding launch scrub post drain walkdown and this pre-launch walkdown may be performed concurrently.

Inspections may also be performed from the RSS, GO₂ Vent Arm (GVA), -Y OWP, or +Y OWP if still extended and accessible.

Ref: 80901019010 (LI) ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are optional walkdown participants.

NASA Engr	(4)
SFOC Engr	(2)
LMSSC - LSS	(1)
Boeing - LSS	(1)
SRB ELE	(1)
Thiokol - LSS	(1)

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

30-1 Debris inspection team **perform** walkdown of SSV and MLP per following:

1. Team leader **verify** S6444 pre-test briefing complete.
2. **Assemble** following essential personnel

NASA PH-H Engineering - 1
SFOC ETM Engineering - 1
3. **Inspect** following areas (as a **minimum**) from the MLP, RSS and FSS to identify/ resolve potential debris sources.

Areas to be inspected

- A. Launch vehicle external surfaces
 - Orbiter
 - SRB's
 - External Tank
- B. MLP surfaces
 - LH and RH SRB holddown posts
 - Deck including deck bolts, fixtures, and edge gutters
 - SSME LH and RH SRB exhaust openings, and sound suppression (SS) troughs
 - TSM's and camera housings
4. Ref Table 30-1, **document** and SIM Photograph SSV and Launch PAD Configuration.

Description: Pre launch walkdown.

OMRSD S00U00.030-1

USA
VM
141

SPC No. 51362

Disc/Frame Nos: 1-39

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

30-2

- 30-2 **Record** all facility discrepancies in S0007. Submit copy to PAD leader and **notify** TBC/CTC. **Verify** no constraints to continue. **Forward** description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

PH-H *Armando Oliva* Date 11/21/02
ARMANDO OLIVA
ETM *Richard S* Date 11-21-02

- 30-3 Operation - Pre-launch Walkdown complete.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 30-1 Photo Requirements for SSV and Launch Pad Configuration

Photos from MLP			
<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET -Z	Vertical	28 mm	
Aft Dome	Horizontal	28 mm	
Aft Dome	Horizontal	35-70 mm	
LH SRB from North	Horizontal	35-70 mm	All water troughs in view
LH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
LH SRB from East	Vertical	35-70 mm	
RH SRB from North	Horizontal	35-70 mm	All water troughs in view
RH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
RH SRB from West	Vertical	35-70 mm	
SRB Heater Elec T-0	Horizontal	35-70 mm	Foam intrusion; May need flash
North HDP	Vertical	35-70 mm	Representative view
South HDP	Vertical	35-70 mm	Representative view
TSM T-0 LH ₂	Vertical	35-70 mm	Flash needed
TSM T-0 LO ₂	Vertical	35-70 mm	Flash needed
Orbiter Left & Right Wing	Vertical	35-70 mm	From below ET (1 Photo each wing)

11-25-02
12/8

OMI S6444 J04
APPROVED

100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918

215 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401
LH ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401

215 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces from FSS	Vertical	35-70 mm	
LH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
RH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
Jack Pad C/O's	Horizontal	35-70 mm	Flash needed (1 each C/O)
LO ₂ Ogive Cable Tray	Vertical	35-70 mm	From RSS roof

255 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces with GO ₂ vent ducts in view	Vertical	35-70 mm	
GO ₂ vent ducts	Horizontal	250 mm	

*** End of Table 30-2 Photo Requirements for SSV and Launch Pad Configuration

*** End of Operation 30 ***

11-25-
13/05

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SPR-65, 333

OPERATION 40 Ice Frost Debris Console Initial Configuration Setup

Shop: SE

Cntrl Rm Console: FR2

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 3.0

NOTE

The next step sets up the photo processing laptop for use in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Network or equipment failures on the photo processing machine shall be annotated below.

40-1 Configure computer to perform image processing, analysis, and recording:

1. **Connect** following equipment at Ice/Frost console:
 - power cable to computer
 - "Dazzle" capture card to laptop parallel port
 - "Y" adapter to laptop PS2 port
 - keyboard to keyboard port on "Y" adapter
 - mouse to mouse port on "Y" adapter
 - monitor to laptop
2. **Insert** Xircon Network Card into Personal Computer PCMCIA port.
3. **Connect** ethernet (gray) cord to Xircon Network Card.
4. **Remove** terminator from video cable.
5. **Plug** BNC-to-RCA adapter into end of video cable.
6. **Plug** video cable into "Dazzle" DVC "video in".
7. **Power-up** Trouble Console VCR.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

8. Log-on to KSC Ground Ops. Click-on Start/Programs/Dazzle.
9. Confirm above equipment as operational and record results.

Results Ready to Support

ETM Richards
Vin P. P. 11-21-02

NOTE

The next step verifies the setup of the infrared scanners. This is not a constraint to set up of the ice console. IR scanner condition shall be annotated below.

- 40-2 Verify IR scanner operation condition, annotate below.

RSS: Ready

CS 2: Ready

ET 05

11-22-02

NOTE

The next step verifies the operation of console monitors in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Equipment condition shall be annotated below.

- 40-3 Verify console condition by powering on monitors and tape recorders.

Monitors: ME 08 11-22-02

Tape recorders: ME 08 11-22-02

11-25-02
ET 05

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

STARS, 220

NOTE

ET OTV pre-mapping/initial position of cameras may be performed in random order.

Ref: 79K24576 (LI) OTV System Installation, LC 39, Pad A and
Ref: 79K24522 (LI) OTV System Installation, LC 39, Pad B define OTV camera locations.

FOV designates field-of view. RSS and -Y OWP must be retracted for completion of pre-mapping.

Pre-mapping steps/substeps in the remainder of this operation need not be performed if supporting a scrub turnaround and if performed during a previous run.

It is preferred to record all pre-mapping scanning on a single tape. However, multiple tapes may be used when lighting/ launch countdown constraints necessitate such.

40-4 CVM1 JTV1 223

Perform OTV pre-mapping of External Tank exterior surfaces using OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, and 067/167 as follows:

- **Insert** designated pre-map tape into trouble console VCR.
- **Punch-up** camera number on trouble monitor.
- **Start** recording on pre-map tape. **Record** start time (GMT).
- **Scan** from top-to-bottom, left-to-right and right-to-left at approximately full zoom-in.
- **Stop** recording on pre-map tape. **Record** stop time (GMT).
- **Record** data in Table 40-1.
- **Repeat** with each OTV camera listed until each has been used to scan the External Tank.
- **Remove** pre-map tape from trouble console VCR.

ETM N/A Date N/A

Not Performed:

ET 05

11/14/02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

40-5 CVM1 JTV1 223

Position OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142,
054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164,
065/165, 066/166, 067/167, 070/170, and 071/171 to initial positions as
defined in Table 40-2.

ETM N/A

Date N/A

Not Performed:

ME
08

11-22-02

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

Table 40-1 ET Pre-Mapping Data		Tape # _____
OTV Camera	Start Time (GMT)	Stop Time (GMT)
004 / 104		
009 / 109		
013 / 113		
033 / 133		
042 / 142		
054 / 154		
055 / 155		
056 / 156		
060 / 160		
061 / 161		
062 / 162		
063 / 163		
064 / 164		
065 / 165		
066 / 166		
067 / 167		

NOT PERFORMED -
See step 40-4 -

Notes: _____

Table 40-2 OTV Camera Initial Positions	
OTV Camera	Initial Position
004 / 104	FOV centered on GUCP
009 / 109	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 063/163 and 064/164.
013 / 113	Full zoom in. View SW GO ₂ Vent Louver area.
033 / 133	FOV perpendicular to ET and with LO ₂ -to-Intertank splice at frame top and LH ₂ -to-Intertank splice at frame bottom. Then tilt down until XT2058 is in frame center.
042 / 142	FOV centered on Orbiter Access Arm-to-Orbiter interface.
054 / 154	FOV to encompass approximately 3 feet forward of XT2058 to 2 feet aft of XT2058. Orbiter wing and SRB should be in view at frame left.
055 / 155	Set FOV on north bridge LH ₂ pipeline flange.
056 / 156	FOV with LH ₂ Aft Dome in frame bottom and XT2058 in view at frame top.
060 / 160	Full zoom in. View SW GO ₂ Vent Louver area.
061 / 161	Full zoom-in. Adjust FOV until ET LO ₂ -to-Intertank splice is centered vertically and view is perpendicular to ET. Pan right until edge of the ET comes into view. Note: LO ₂ Tank may pass out-of-view.
062 / 162	Full zoom in. View NW GO ₂ Vent Louver area.
063 / 163	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 064/164.
064 / 164	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 063/163.
065 / 165	Full zoom out. Set FOV on aft part of ET with frame bottom approximately 2 feet below LH ₂ Aft Dome.
066 / 166	FOV perpendicular to ET with LO ₂ -to-Intertank splice at frame top. Then tilt down until Orbiter RH Wing/SRB intersection is in frame lower right.
067 / 167	Set FOV with LH ₂ Aft Dome toward frame bottom and 2 nd black ring of SRB in view.
070 / 170	Select down wind camera of these two as wide angle view of the SSV.
071 / 171	Set up wind camera for close-up view of SSME's.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

40-6 Operation - Ice Frost Debris Console Initial Configuration Setup complete.

ETM

ME
08

 Date 11-22-02

*** End of Operation 40 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

OPERATION 50 SSV Debris Assessment

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Steps in this operation are contingent upon progression of launch countdown operations and may not be performed if countdown is terminated.

Entire Operation Not Performed: N/A

NOTE

Until otherwise indicated, all times are referenced to S0007, S0014 or S0037 timelines.

No operations/steps within this subtask OMI may be performed as a stand-alone procedure. This OMI may only be performed as a subtask to S0007/S0014/S0037.

NOTE

Ref: SPI SP-519 (LI) OMI and OM Implementation and Ref: SFOC GO0007 (LI) Quality Planning Requirements Document (QPRD), following step complies with requirements for ROR-as-CMQC function.

50-1

CTIF	TBC
TBC	CMQC 136

Notify TBC that CTIF will perform the CMQC function for STS 113, S6444 run 2. Request TBC notify CMQC that the ROR-as-CMQC option will be exercised for STS 113, S6444 run 2.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-2

CTC	TBC	232
TBC	CTIF	136

Perform OTV and ice/frost monitoring area setups.

ETM

ME
08

Date 11-22-02

50-3

CTIF	TBC	136
TBC	CTC	
CTC	STM	232

Verify Operation 10- Support Preparations complete.

ETM

ME
08

Date 11-22-02

50-4

CTIF

Verify Operation 20 - Ice Prediction Briefing and Operation 30- Pre-launch Walkdown complete.

ETM

ME
08

Date 11-22-02

50-2

11/25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SEAS, 224

50-5

CTIF CVM1 222
CVM1 222

Verify:

- All OTV cameras are on, tapes in recorder, and ready to commence OTV scanning, monitoring, and recording.
- Trouble tape recorder is ready.
- Ice Frost Debris Console Initial Configuration Setup complete.

ETM

ME
08

Date 11-22-02

50-6

CTIF CICE 222
CVM1
CVM2
CIPC
CTIF JYVR 138
CVM1 JTV1 223
CVM2 JTV2 225

All personnel participating in OTV operations **report** test ready status.

ETM

ME
08

Date 11-22-02

Support: COMM

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-7

CTIF	TBC	136
TBC	CTC	232

Ice Frost Console Area Setups for OTV scanning complete.
Report readiness.

ETM

ME
08

Date 11-22-02

Not Performed: N/A

50-8

CTIF	CVM1	222
------	------	-----

From start of LO₂ chilldown until seal deflation/GO₂ vent hood retraction, **monitor** the +Y/-Y GO₂ vent seal-to-ET interface for seal fretting and continuous GO₂ escape.

OMRS S00FB0.350-1

ETM

ME
08

Date 11-22-02

Not Performed: N/A

50-4

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

NOTE

GO₂ vent seal fretting could induce damage to ET SOFI. Continuous GO₂ venting could result in formation of ice in the no ice zone (ref NSTS 16007). Ultimate decision to lift the vent hood rests with CMEC.

50-9

CTIF TBC 136
CMEC

If +Y/-Y GO₂ vent seal fretting or continuous GO₂ escape detected from start of LO₂ chilldown until seal deflation, **notify** CMEC for GO₂ vent hood removal.

ETM N/A Date N/A

Not Performed:

ME
OB

11-22-02

50-10

CTIF CIPC 222

Monitor wind speed and direction from start of LO₂/LH₂ chill down through launch/scrub. CIPC **notify** CTIF if winds measured at 38 knots or greater from North +/-30 degrees as measured at 60 feet.

ETM ME Date 11-22-02
OB

Not Performed: N/A

50-5

11-25-02

ME
OB

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Excessive vapors are defined as being more severe than those described in NSTS 08303 (LI) NSTS Program Ice/Debris Inspection Criteria or NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem.

50-11

CTIF CVM1 222
CVM2

From start of LO₂/LH₂ loading until Prepressurization
(LO₂ at T-2M55s and LH₂ at T-1M57s):

1. Monitor following ET-Orbiter MPS areas for leakage:
 - LO₂ Feedline (portion external to the Intertank)
 - LH₂ Feedline
 - LH₂ Recirculation Line
 - LH₂ Aft Dome Manhole Cover(s)
 - ET-Orbiter LO₂/LH₂ Umbilical Disconnects
 - LH₂ T-0 Umbilical
 - LO₂ T-0 Umbilical
2. Verify no visible cryogenic liquid or excessive vapors.

OMRS S00FB0.360-1

ME
08

ETM _____ Date 11-22-02

Not Performed: N/A

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-12

50-12

CTIF CVM1 222
CVM2

Monitor and videotape following ET TPS surface areas and GO₂ Vent Area during LO₂/LH₂ loading through Prepressurization (LO₂ at T-2M55s and LH₂ at T-1M57s):

- LH₂ Aft Dome
- LH₂ Barrel
- Intertank (external)
- LO₂ Tank
- GO₂ Vent Area
- Protuberances

OMRS S00FB0.005-1

ETM

ME
08

 Date 11-22-02

Not Performed: N/A

50-13

CTIF CVM1 222

Perform Operation 60 - Group 1 Monitoring.

ETM

ME
08

 Date 11-22-02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-14

CTIF CVM2 222

Perform Operation 70 - Group 2 Monitoring.

ETM

ME
08

Date 11-22-02

Not Performed: N/A

50-15

CTIF CVM2 222

Once per hour minimum, after start of LO₂/LH₂ (until LO₂/LH₂ low level sensors read dry), scan LO₂ feed line brackets and flange closeouts per Table 50-1.

ETM

ME
08

Date 11-22-02

Not Performed: N/A

50-8

11/25/02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-16

CTIF CICE 222

As count proceeds, for concerns/ observations identified:

1. **Record** observation/concern on trouble tape per Table 50-1.
2. **Document** observed condition on Table 50-2, Observation Worksheet.

ETM



Date 11-22-02

Not Performed: N/A

50-17

TBC CTIF 136
CTIF CICE 222

Perform Operation 80 - Final Inspection when called by
S0007/S0014/S0037.

ETM



Date 11-22-02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Final SSV scan typically commences at L-2 hours.

50-18

CTIF CVM1 222
CVM2

Perform final SSV scan.

ETM

ME
08

Date 11-22-02

Not Performed: N/A

50-19

CTIF CVM1 222
CVM2

At start of T-9 minute hold, configure OTV cameras for terminal count.

ETM

ME
08

Date 11-22-02

Not Performed: N/A

50-10

11-25-02
ME
08

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SEARS, J. J.

50-20

CTIF

222

Start continuous recording per Table 50-1 at pick-up of T-9 Minute count including following events:

- T-7M30S OAA retraction on camera OTV 008/108 or 042/142.
- T-3M55S Orbiter elevon movement on OTV 009/109, 054/154, 063/163 064/164.
- T-2M30S GOX Vent Seal retraction, +Y / -Y GOX Vent Louvers, and GOX Vent Seal Footprints on OTV 013/113, 060/160, 061/161, 062/162, 068/168, and 069/169.
- T-1M00S through last view of vehicle during ascent on NASA Select (channel 179).

ETM N/A Date N/A

Not Performed:

ME
08

11-22-02

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem Appendix F: Ice Launch Commit Criteria defines "No-Go Conditions."

50-21

CICE CTIF 222

Verify there are no Ice Launch Commit Criteria "No-Go Conditions" being violated.

ETM

ME
08

Date 11-22-02

50-22

If winds are from the north (+/-30 degrees) and are 38 knots (peak as measured at 60 feet above ground) or greater:

1. Monitor/videotape nose cone area during high winds.
2. Verify:
 - A. No ice formation on the +Y and -Y GO₂ vent seal footprint areas.
 - B. No damage to the ET TPS at the +Y and -Y GO₂ vent seal footprint areas.
 - C. No damage to the +Y and -Y GO₂ vent seals themselves.
 - D. No evidence of GO₂ leakage from +Y/-Y GO₂ vent seals to ET interface.

OMRSD S00L00.150

ETM

N/A

Date

N/A

Not Performed:

ME
08

11-22-02

50-12

11-25-02

ME
08

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-23

CTIF

Verify launch or launch scrub (drain back). Record data.

Launch _____ Scrub ☒

Date 11-22-02 Time 01:10 GMT

Scrub at T- 9.00 minutes

ETM R Bruner 11/22 Date 11-22-02

50-24

CTIF

ET-Orbiter MPS monitoring for leakage and ET TPS Surface Areas
and GO₂ Vent Area monitoring/recording for launch complete.

OMRSD S00FB0.005-1

OMRSD S00FB0.360-1

USA
VM
141

ETM NA Date _____

Not Performed: ET/05
11-25-02

50-13

11-25-02
11/1

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

When completely filled and drain is initiated, it takes approximately 1 hour until the LH₂ tank low level sensors read dry, and approximately 1.5 hours until the LO₂ tank low level sensors read dry.

50-25

CTIF CVM1 222
CVM2

If launch scrubbed (or drain back declared) after start of LO₂/LH₂ slow fill mode:

- Perform Operation 90 - LO₂/LH₂ Drain Monitoring.
- Record observations/concerns on trouble tape per Table 50-1.
- Document all observations/concerns on Table 50-2 Observation Worksheet.

ETM R. Brewer Date 11-22-02

Not Performed: N/A

50-26 CTIF

GO₂ Vent seal to ET interface monitoring for seal fretting and continuous GO₂ escape complete.

USA
VM
141

OMRSD S00FB0.350-1

ETM N/A Date 11-22-02

Not Performed: [Signature]
11-22-02

[Signature]
11-22-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

STARS 132

50-27

CTIF CVM1 222
CVM2

Terminate scanning operations.

ETM R Brewer Date 11-22-02

50-28

CTIF CVM1 222
CVM2

Perform Operation 100 - Console Securing.

ETM R Brewer Date 11-22-02

50-29

CTIF

If LO₂/LH₂ tanking started, perform Operation 110 - Summary
Tape.

ETM R Brewer Date 11/22/02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Following step may be not performed at CTIF discretion.

50-30 CTIF TBC 136
 TBC STM

If Post Drain Walkdown to occur at night, request PAD xenon lighting be maintained/activated for duration of walkdown.

Not Performed: N/A

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

50-31

CTIF

If launch scrubbed after start of LO₂/LH₂ tanking, perform Operation 120 - Post-Drain Walkdown.

ETM R. Brewer Date 11/22/02

Not Performed: N/A

50-32

CTIF

If launch occurred, perform Operation 130 - Post launch Walkdown.

ETM N/A Date _____

Not Performed: E/S
11-22-02

50-16

E/S
11-22-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50-33

CTIF

If launch occurred, **perform** Operation 140 - Film Review.

ETM N/A Date N/A

Not Performed:

ME
08

11-22-02

50-34

SSV Debris Assessment complete.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 50-1 Observation Documentation Procedure

1. CTIF CVM1 222 Locate anomaly/concern on pertinent OTV(s)
CVM2
2. CTIF Punch-up pertinent OTV on trouble monitor.
Update trouble tape log in table below.
3. CTIF Start the trouble tape.

NOTE

Trouble tape shall be allowed to run until sufficient OTV documentation of observation/concern has been made. OK to change OTV's while trouble tape is running.

- 4 CTIF After observation/concern has been documented on the trouble tape, stop the trouble tape. Update trouble tape log below.

TROUBLE TAPE LOG

Trouble Tape No.	Start Time (GMT)	Stop Time (GMT)	OTV	Description
01	17:30	17:32	054	L02 F/L SCAN
01	18:30	18:32	054	L02 F/L SCAN
01	19:30	19:32	054	L02 F/L SCAN
01	19:56	19:58	009	1 ICE/Frost Spot on F/L Longeron
01	20:01	20:02	054	3 Frost Spots on t/Y Longeron
01	20:15	20:19	054	Frost Spots on L02 F/L Suprt Bkt
01	20:19	20:21	055	Frost Spots on L02 Cpx-Flex Panel
01	20:42	20:58	054	L02 F/L SCAN & Longeron
01	21:06	21:07	063	2-Y Longeron Frost Spots
01	21:17	21:18	063	Small Frost Spot - Y JACK PAD

TROUBLE TAPE LOG

11-22-02

OMI S6444 J04
APPROVED

Figure 1

PHL RAN
BOND
~ XT 12

11-22-0:

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. 001

Observed By: Mark Wollam

Date 11/22/02 Time 1900 GMT 00:01

Camera No. (or Walkdown) 054, 009, 063

Description:

Small frost spots were detected on surface of ET
TPS components and acreage (+Y/-Y longeron, L02 F/L
Support Bracket, -Y Jack Pad, Outboard LH2 PAC ramp, +Y
Vert strut C/O and L02 ogive (barrel-)

Acceptance Rationale (or IPR/PR No.):

All spots / frost areas seen and listed above are
acceptable per NSTS 08303 and are within the
experience database.

CICE Armando Oliva A. Oliva Date 11/22/02

CTIF M. B. Mullins ⁵³¹⁰¹ Date 11/22/02

MULLINS

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SEARS, J.S.

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. 002

Observed By: R. Brewer

Date 11/22/02 Time 19:56 GMT 00:56

Camera No. (or Walkdown) 060

Description:

LIGHT FROST ON LO²/LH²(+V/-Z) FOAM AREAS -

Acceptance Rationale (or IPR/PR No.):

FROST IS WITHIN THE REQUIREMENTS OF
NSTS 8303 AND ACCEPTABLE DATA BASE.

CICE [Signature] Date 11/22/02

CTIF [Signature] Date 11/22/02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

15/03
11-22-02

OMI S6444 J04
APPROVED

1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126
2127
2128
2129
2130
2131
2132
2133
2134
2135
2136
2137
2138
2139
2140
2141
2142
2143
2144
2145
2146
2147
2148
2149
2150
2151
2152
2153
2154
2155
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172
2173
2174
2175
2176
2177
2178
2179
2180
2181
2182
2183
2184
2185
2186
2187
2188
2189
2190
2191
2192
2193
2194
2195
2196
2197
2198
2199
2200
2201
2202
2203
2204
2205
2206
2207
2208
2209
2210
2211
2212
2213
2214
2215
2216
2217
2218
2219
2220
2221
2222
2223
2224
2225
2226
2227
2228
2229
2230
2231
2232
2233
2234
2235
2236
2237
2238
2239
2240
2241
2242
2243
2244
2245
2246
2247
2248
2249
2250
2251
2252
2253
2254
2255
2256
2257
2258
2259
2260
2261
2262
2263
2264
2265
2266
2267
2268
2269
2270
2271
2272
2273
2274
2275
2276
2277
2278
2279
2280
2281
2282
2283
2284
2285
2286
2287
2288
2289
2290
2291
2292
2293
2294
2295
2296
2297
2298
2299
2300
2301
2302
2303
2304
2305
2306
2307
2308
2309
2310
2311
2312
2313
2314
2315
2316
2317
2318
2319
2320
2321
2322
2323
2324
2325
2326
2327
2328
2329
2330
2331
2332
2333
2334
2335
2336
2337
2338
2339
2340
2341
2342
2343
2344
2345
2346
2347
2348
2349
2350
2351
2352
2353
2354
2355
2356
2357
2358
2359
2360
2361
2362
2363
2364
2365
2366
2367
2368
2369
2370
2371
2372
2373
2374
2375
2376
2377
2378
2379
2380
2381
2382
2383
2384
2385
2386
2387
2388
2389
2390
2391
2392
2393
2394
2395
2396
2397
2398
2399
2400
2401
2402
2403
2404
2405
2406
2407
2408
2409
2410
2411
2412
2413
2414
2415
2416
2417
2418
2419
2420
2421
2422
2423
2424
2425
2426
2427
2428
2429
2430
2431
2432
2433
2434
2435
2436
2437
2438
2439
2440
2441
2442
2443
2444
2445
2446
2447
2448
2449
2450
2451
2452
2453
2454
2455
2456
2457
2458
2459
2460
2461
2462
2463
2464
2465
2466
2467
2468
2469
2470
2471
2472
2473
2474
2475
2476
2477
2478
2479
2480
2481
2482
2483
2484
2485
2486
2487
2488
2489
2490
2491
2492
2493
2494
2495
2496
2497
2498
2499
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
2516
2517
2518
2519
2520
2521
2522
2523
2524
2525
2526
2527
2528
2529
2530
2531
2532
2533
2534
2535
2536
2537
2538
2539
2540
2541
2542
2543
2544
2545
2546
2547
2548
2549
2550
2551
2552
2553
2554
2555
2556
2557
2558
2559
2560
2561
2562
2563
2564
2565
2566
2567
2568
2569
2570
2571
2572
2573
2574
2575
2576
2577
2578
2579
2580
2581
2582
2583
2584
2585
2586
2587
2588
2589
2590
2591
2592
2593
2594
2595
2596
2597
2598
2599
2600
2601
2602
2603
2604
2605
2606
2607
2608
2609
2610
2611
2612
2613
2614
2615
2616
2617
2618
2619
2620
2621
2622
2623
2624
2625
2626
2627
2628
2629
2630
2631
2632
2633
2634
2635
2636
2637
2638
2639
2640
2641
2642
2643
2644
2645
2646
2647
2648
2649
2650
2651
2652
2653
2654
26

OBSERVATION DOCUMENTATION

CTIF _____ Date _____

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

11-22-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SECRET, 1335

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

11-22-02
[6/8]

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

57662, 1306

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____

*** End of Table 50-2 Observation Worksheet ***

*** End of Operation 50 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

OPERATION 60 Group 1 Monitoring LO₂ Chill Down Thru T-0

Shop: SE

Cntrl Rm Console: FR2

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before LO₂ Chill Down commences.

Operation Not Performed: NA

NOTE

This operation monitors LO₂ Ogive and Barrel and associated components/ areas from start of Chill Down through T-0 via OTV cameras 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164.

OTV cameras 013/113 and/or 062/162 will view -Y GO₂ Vent Hood Seal at all times. At no time will both cameras be positioned away from the -Y GO₂ Vent Hood Seal.

OTV cameras 068/168 and 069/169 view SW and NE GO₂ Vent Areas respectively. These are fixed FOV cameras and do not have pan, tilt, etc. capability.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

11-22-02
ET 05

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

LO₂ Chill Down To L-2 Hour Mark

60-1 CVM1 JYVR 138

At start of vehicle LO₂ Chill Down, start recorders for cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169.

ETM Tom Ford Date 11-21-02
TOM FORD Support: COMM

60-2 Record LO₂ MPS Chill Down start date and time (GMT).

ME 10 11-21-02
LO₂ MPS Chill Down Date 11-21-02 GMT Time 11-21-02 GMT

ETM Tom Ford Date 11-22-02
TOM FORD

60-3 CVM1 JTV1 223

From start of LO₂ Chill Down until start of LO₂ Fast Fill on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169 monitor/videotape ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM Tom Ford Date 11-22-02
TOM FORD Support: COMM

Not Performed: NA

11-22-02
ME 10

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

60-4 Record LO₂ Slow Fill start date and time (GMT).

LO₂ Slow Fill Date 11-22-02 GMT Time 17:54 GMT

ETM Tom Ford Date 11-22-02

Not Performed: NA

60-5 Record LO₂ Fast Fill start date and time (GMT).

LO₂ Fast Fill Date 11-22-02 GMT Time 18:08 GMT ET 05 11-22-02

ETM Tom Ford Date 11-22-02

Not Performed: N/A

60-6 CVM1 JTV1 223

From start of LO₂ Fast Fill until LO₂ stable replenish mode is established, monitor/videotape ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. Scan LO₂ Tank. Alternate cameras and scan from Intertank to LO₂ Barrel Splice to GO₂ Vent Hood. No cryogenic liquid or excessive vapors allowed.

ETM Mark Wollen ME 10 Date 11/22/02

Support: COMM

Not Performed: NA

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

60-7 Record LO₂ Topping date and time (GMT).

LO₂ Topping Date 11/22/02 GMT Time 20:07 GMT

ETM

ME
10

Date 11/22/02

Not Performed: NA

60-8 Record LO₂ Stable Replenish mode start date and time (GMT).

LO₂ Stable Replenish Date 11/24/02 GMT Time 20:14 GMT

ETM

ME
10

Date 11/22/02

Not Performed: NA

60-9 CVM1 JTV1 223

From time LO₂ Stable Replenish mode is established until time for final SSV scan (approximately L-2 hours), monitor, scan and videotape ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. No cryogenic liquid or excessive vapors allowed.

ETM

ME
10

Date 11/22/02

Support: COMM

Not Performed: NA

11-25-02
ET/05

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

During Final SSV Inspection Scan the camera lights on OTV cameras 061/161 and 062/162 shall be turned "Off" when view passes over the Orbiter cockpit to preclude "distracting" the Flight Crew.

60-10 CVM1 JTV1 223

Perform Final SSV Inspection Scan with OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164. Scan passes shall view entire SSV with cameras at approximate full zoom in during final scan.

ETM

MS
17

 Date 11/22/02

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Terminal Count Camera Positions

NOTE

This step performed for SSME ignition only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute count. Cameras must be positioned for ignition no later than T-9 minutes. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM1 camera positions for SSME ignition are defined in Table 60-1.

60-11 CVM1 JTV1 223

Ref Table 60-1, position cameras 004/104, 013/113, 042/142, 054/154, 060/160, 062/162 for terminal count.

ETM

MS
17

Date 11/22/02
Support: COMM

Not Performed: N/A

60-12 Operation - Group 1 Monitoring - LO₂ Chill Down Thru T-0 complete.

11-25-02
ET
05

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

Table 60-1 CVM1 Camera Positions for Terminal Count

NOTE

This Table defines CVM1 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition non-sequentially.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

The GO₂ Vent Arm (GVA) retracts at T-2m30s.

CVM1 Camera Positions Are Defined As Follows:

004/104

GUCP centered in frame so that GUCP will stay in view throughout SRB "twang".

042/142

At approximately T-1 hour, view and monitor Orbiter access arm while Orbiter hatch is being closed.

At T-7m30s, watch Orbiter access arm retract, then view bipod strut in center of frame, LO₂ feedline fairing in top of frame, and Orbiter hatch in right of frame.

054/154

At T-3m50s, view Orbiter right hand body flap movement, then zoom out with Orbiter/ET umbilicals at approximate frame center, Orbiter trailing edge at frame bottom, and edge of +Y (RH) SRB just in view at frame right.

11-25-82
[E] 15

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 60-1 CVM1 Camera Positions for Terminal Count

013/113

At T-2m30s, watch lift of GO₂ vent arm for debris and nose cone/vent louvers for ice damage. Immediately following lift of GO₂ vent arm, center frame on GO₂ vent louver and then zoom-out so that entire ET movement is seen during SRB 'twang' at SSME ignition.

060/160

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the GO₂ vent louver. After CICE concurrence, go full zoom out and position camera with SSV centered and ET nose cone at frame top.

062/162

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the -Y GO₂ vent louver. After CICE concurrence, zoom out until ET nose spike is at top of frame with ET centered.

061/161

At approximately T-4m00s, verify camera lights are off. Then position camera to view astronaut closing visor at T-2 minutes 00 seconds.

068/168 and 069/169

Immediately after GO₂ vent hood lift, turn lights off to preclude distracting orbiter crew when the GVA rotates to its latchback position.

063/163

SRB AND ORBITER WING IN VIEW CENTERED OVER LH2 FIRE DETECTION SYSTEM (BUTCHER PAPER)

*** End of Table 60-1 Camera Positions for Terminal Count ***

*** End of Operation 60 ***

16/18

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

STARS, 101

OPERATION 70 Group 2 Monitoring - LH₂ Chill Down Thru T-0

Shop: SE

Cntrl Rm Console: FR2

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before start of LH₂ Chill Down.

Operation Not Performed: N/A

NOTE

This operation monitors LH₂ Barrel and associated components/areas start of LH₂ Chill Down to pre-pressurization via OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

LH₂ Chill Down To L-2 Hour Mark

70-1 CVM2 JYVR 138

At start of LH₂ Chill Down, start recorders for cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

ETM

ME
08

Date 11-22-02

Support: COMM

70-2 Record LH₂ Chill Down start date and time (GMT).

LH₂ Chill Down Date 11-22-02 Time 17:16 GMT

ETM

ME
08

Date 11-22-02

70-3 CVM2 JTV2 225

From start of propellant loading until start of LH₂ Fast Fill on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, monitor/videotape ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM

ME
08

Date 11-22-02

Support: COMM

Not Performed: N/A

70-2

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

50
42
34
26
18
10
02

70-4 Record LH₂ Slow Fill start date and time (GMT).

LH₂ Slow Fill Date 11-22-02 Time 17:23 GMT

ETM ME
08 Date 11-22-02

Not Performed: N/A

70-5 Record LH₂ Fast Fill start date and time (GMT).

LH₂ Fast Fill Date 11/22/02 Time 1802 GMT

ETM MS
17 Date 11/22/02

Not Performed: N/A

70-6 CVM2 JTV2 225

From start of LH₂ Fast Fill until stable replenish mode is established, scan LH₂ Tank. Alternate OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167 and scan/videotape from LH₂ Aft Dome to Intertank.

ETM MS
17 Date 11/22/02

Support: COMM

Not Performed: N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

70-7 Record start date and time (GMT) for LH₂ Topping.

LH₂ Topping Date 11/22/02 Time 1914 GMT

ETM MS
17 Date 11/22/02

Not Performed: N/A

70-8 Record LH₂ Stable Replenish mode start date and time (GMT).

LH₂ Stable Replenish Date 11/22/02 Time 1945 GMT

ETM MS
17 Date 11/22/02

Not Performed: N/A

70-9 CVM2 JTV2 225

During LH₂ Stable Replenish mode and until time for final scan (approximately L-1.5 hours), on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, monitor/videotape ET TPS surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, and TSM LH₂/LO₂ Umbilicals. No cryogenic liquid or excessive vapors allowed.

ETM ME
08 Date 11-22-02

Support: COMM

Not Performed: N/A

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final SSV Inspection Scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

70-10 CVM2 JTV2 225

Perform Final SSV Inspection Scan with OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 064/164. Scan passes shall view entire SSV with cameras at full zoom in during final scan.

ETM

R Brewer

Date

11-22-02

Support: COMM

Not Performed:

N/A

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

T-9 Minute Terminal Count

NOTE

Next step performed for terminal count only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute terminal count. Cameras must be positioned for SSME ignition no later than T-9 minutes. 'Spot' scanning after pick-up of the T-9 minute terminal count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM2 camera positions for terminal count are defined in Table 70-1.

70-11 CVM2 JTV2 225

Ref Table 70-1, position cameras 009/109, 033/133, 056/156, 065/165, 066/166 061/161, 070/170, 071/171 and 067/167 for terminal count.

ETM R Brewer Date 11/22/02

Support: COMM

Not Performed: N/A

70-12 Operation - Group 2 Monitoring - LH₂ Chill Down Thru T-0 complete.

11-25-02
16/10

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 70-1 - CVM2 Camera Positions for Terminal Count

NOTE

This Table defines CVM2 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

The Orbiter access arm (OAA) retracts at T-7M30S. Orbiter body flap movement occurs at T-3m50s.

Cameras may be positioned for SSME ignition non-sequentially

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

Group 2 Camera Positions Are Defined As Follows:

033/133

Full zoom out. LO₂ feed line in frame center and MLP deck at bottom.

055/155

View ET aft dome with MLP deck just out of view at bottom, ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

056/156

View ET aft dome with MLP deck just out of view at bottom. ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

065/165

Full zoom out. SSV centered. MLP deck edge just in view at bottom.

066/166

ET centered. Intertank to LO₂ Barrel splice at frame top with the majority of Orbiter wing in view.

067/167

Center on GUCP for optimum view.

070/170 and 071/171

At T-9m00s, zoom in on space shuttle main engine with camera providing best view. Zoom out on SSME for wide angle view with other camera.

009/109

At approximately T-3m50s, position to view Orbiter body flap and elevons movement. Afterwards, center on LH₂ umbilical with -Y vertical strut at frame top.

061/161

At approximately T-1m30s, tilt-up to GO₂ Vent Footprint. Zoom in. Pause. If footprint is acceptable, zoom out and tilt down to view Orbiter nose/cockpit through liftoff.

***** End of Table 70-1 - CVM2 Camera Positions for Terminal Count *****

***** End of Operation 70 *****

11-25-02
[Signature]

OMI S6444 J04
APPROVED

OPERATION 80 Final Inspection

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

NOTE

Final Inspection may not need to be performed depending on LO₂/LH₂ tanking and launch countdown, as determined by CTC/TTL.

Final Inspection Team stay time guidelines for each level are given in Table 80-1. These guidelines are for reference only and may be deviated from at PICE discretion.

Operation Not Performed: NA

11-25-02
[5/5]

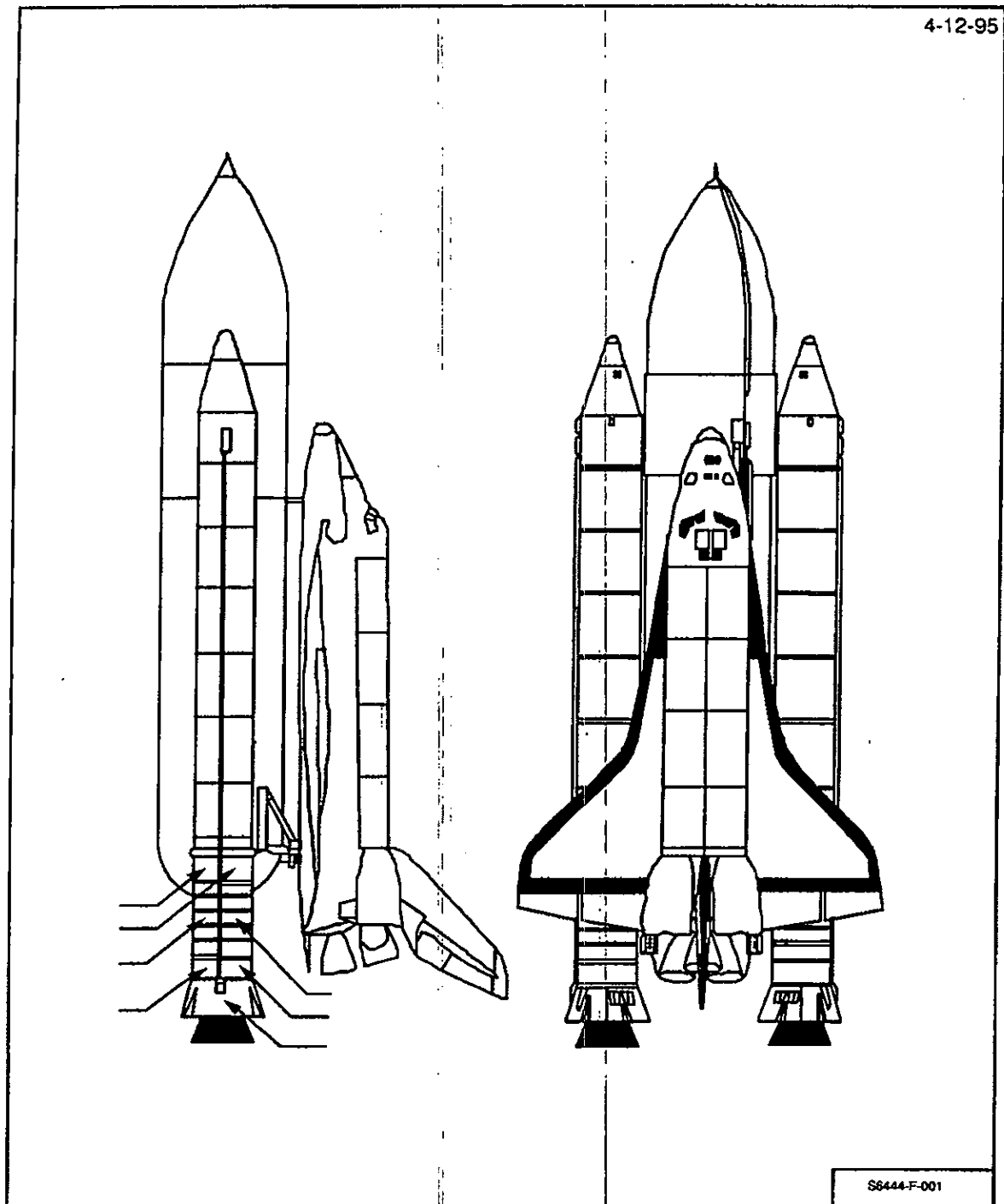
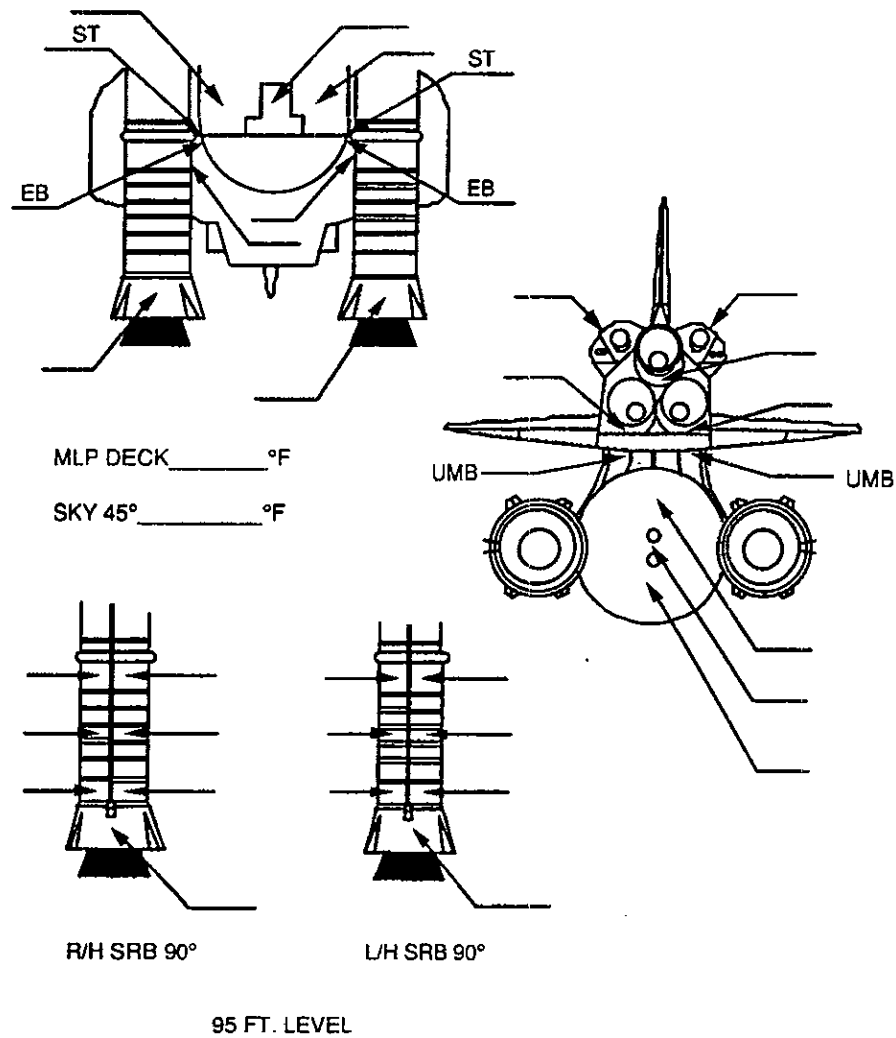


Figure 80-1: Deck (0) Level
(For Reference Only)

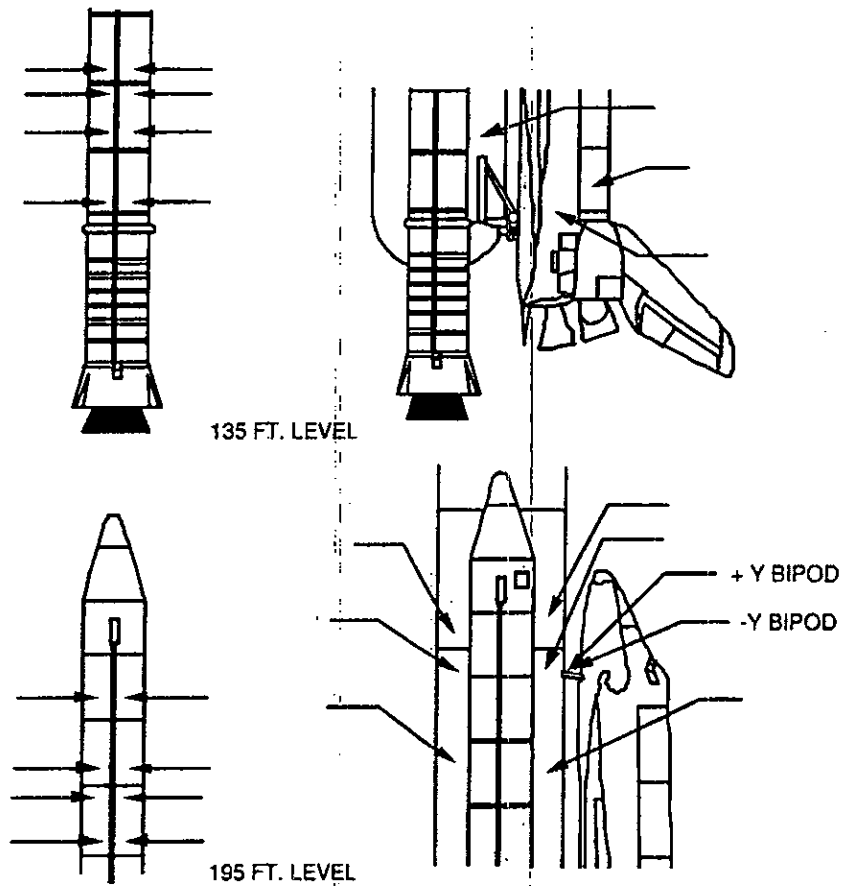
4-13-95



S6444-F-002

Figure 80-2: Deck (0) and 95 Ft Levels
(For Reference Only)

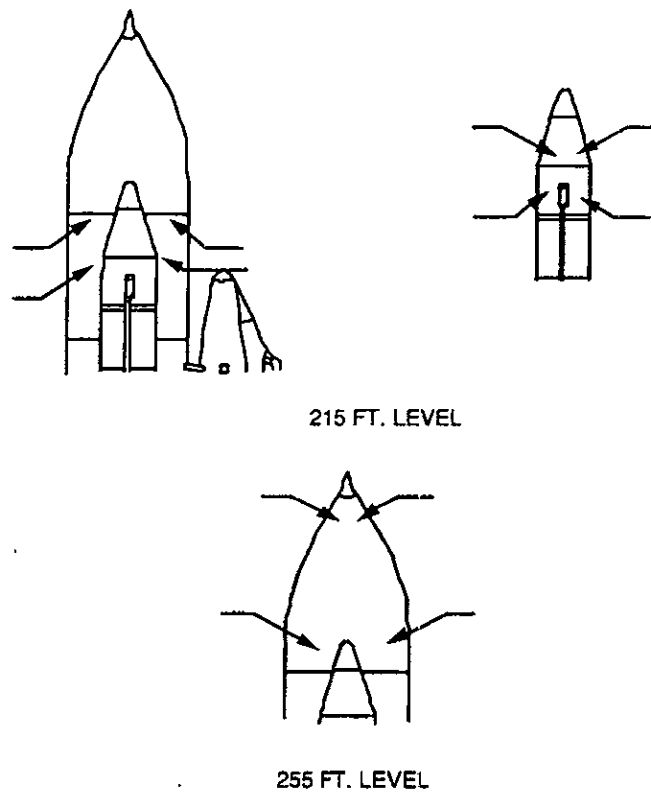
4-12-95



S6444-F-003

Figure 80-3: 135 and 195 Ft Levels
(For Reference Only)

4-12-95



S6444-F-004

Figure 80-4: 215 and 255 Ft Levels
(For Reference Only)

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

WARNING

Personnel performing final inspection shall be attired in **Nomex coveralls with gloves and hoods**. Personnel shall have available gloves, hoods, and ELSA at all times during walkdown.

Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in bayonet connector and the lithium button battery door is locked and taped in place. Personnel shall ensure the flash is not activated on the camera.

Personnel using Kodak DC-50/120 shall verify alkaline batteries are properly installed and the flash is not active on the camera.

Personnel using digital cameras (Sony DKC ID1, Kodak DC-50/120 shall not use these cameras in the presence of a hydrogen leak or an oxygen enriched atmosphere (readings greater than 23 percent O_2).

NOTE

Task Team Leader (TTL) for final inspection is PH-H. Additional personnel (listed below) may be added to the final inspection team with CTC, Launch Director, and Safety concurrence.

JSC Level II	(1)
PH-H	(2)
SFOC ETM	(1)

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

80-1 Assemble following final inspection team members:

TTL - PH-H	(1)
PH-H	(1)
SFOC ETM	(2)
LMSSC LSS	(1)
SFOC Safety	(1)

80-2 Final inspection team **perform** walkdown of SSV and associated facilities as follows:

NOTE

Following substep may be not performed with TTL concurrence.

Tables 80-2 and 80-3 are reference only items. Images are to be taken of targets of opportunity. Images must be taken with 35 mm and digital cameras. Digital images shall be inputted into SIMS.

1. Ref Tables 80-2 and 80-3, photograph SSV points of opportunity during final inspection using 35 mm. **Record data.**

Roll No.

Negative No. NA

Work order No.

Sub Step Not Performed: 6/5

11-22-02

2. Reference Tables 80-2 and 80-3, **take** digital image of SSV points of opportunity using digital camera.

Description: Final Inspection Team

SPC No. 5117/5118/5119

Disc/Frame Nos: 1-40/1-50/1-14

3. See Figures 80-1 through 80-4, **measure and record** (deg F) SSV external surface temperatures using IR gun(s)/scanners.

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

The following substep references inspection areas. However, inspection shall not be limited to these areas. Inspection shall be of entire SSV and specific areas of concern as defined by the TTL, CTC, or Launch Director.

4. Visually inspect:

- Orbiter aft engine compartment external surfaces for condensation and ice formations.
- ET TPS surfaces which cannot be observed by the OTV system.
- Specific areas of concern as determined by the TTL, CTC, or Launch Director.

OMRSD S00U00.020-A-1

OMRSD S00U00.020-C-1

OMRSD S00U00.020-D-1

80-3 Final Inspection complete. Verify no constraints to continue. Forward description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

TTL (PH-H)

Armando Oliu Date 11/22/02
ARMANDO OLIU

SFOC-ETM

Tom Ford Date 11.22.02
TOM FORD

80-4 Operation - Final Inspection complete.

ETM

Tom Ford Date 11.22.02

80-8

W13

11.25-02

Table 80-1 Final Inspection Team Walkdown Stay Times

255 Ft Level - 5 Minutes

- LO₂ Ogive and Barrel acreage
- GO₂ Pressurization Line
- LO₂ Tank Cable Tray
- Visible LH SRB surfaces
- GO₂ Vent Ducts

215 Ft Level - 20 Minutes

- ET GH₂ 7 inch Vent Assembly
- ET acreage (between -Z and -Y axis)
- GO₂ vent area
- Orbiter tiles
- Visible SRB surfaces
- Inter tank-to-LO₂ Barrel splice

195 Ft Level - 10 Minutes

- LO₂ Feed Line
- ET/Orbiter Bipods (side and bottom view)
- -Y ET/SRB forward attachment (bottom view)
- -Y ET/SRB aft attachments (top view)
- Inter tank splice areas (LO₂ and LH₂)
- ET acreage (between -Y and +Z axis)
- Orbiter tiles
- Visible LH SRB surfaces

135 Ft Level - 10 Minutes

- LH₂ ET/Orbiter Umbilical
- -Y ET/SRB C/T
- -Y Vertical Strut
- LO₂ Feed Line
- ET acreage between -Y axis and +Z axis
- ET/Orbiter attachments (top view)
- Visible LH SRB surfaces
- Orbiter aft fuselage

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-1 Final Inspection Team Walkdown Stay Times
0 Level - 30 Minutes

- LH₂ Aft Dome
- ET acreage around +Z axis
- ET acreage around -Z axis
- LO₂ Feed Line
- LH₂ Feed Line
- ET/Orbiter attachments - Bottom view
- ET/Orbiter LH₂ and LO₂ Umbilicals
- T-0 LH₂ and LO₂ Umbilicals
- Space Shuttle Main Engines (SSME)
- Orbiter tiles
- ET/SRB aft attachments
- Visible SRB surfaces
- SRB ignition overpressure sound suppression water troughs

*** End of Table 80-1- Final Inspection Team Walkdown Stay Times ***

11-25-02
11/25

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

Table 80-2 Final Inspection Team - Telephotos

TELEPHOTOS - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
GO ₂ Vent Ducts	Horizontal	
LO ₂ Acreage	Vertical	

TELEPHOTOS - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
-Y Bipod Ramp	Horizontal	From RSS
LO ₂ P/L Ice Frost Ramps	Vertical	From RSS; Requires 3-4 shots
GO ₂ Seal/Hood	Horizontal	From haunch & RSS
GUCP	Vertical	

TELEPHOTOS - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
-Y Bipod Ramp & Jack PAD C/O	Horizontal	

TELEPHOTOS - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	
-Y Longeron	Vertical	If needed
Jack Pad Closeouts	Horizontal	
LH ₂ Acreage	Vertical	

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-2 Final Inspection Team - Telephotos

TELEPHOTOS - MLP

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	From West
LH ₂ UMB	Horizontal	From NW
EB-7	Horizontal	
EB-8	Horizontal	
LH ₂ Aft Dome	Horizontal	
Third Hard Point C/O	Vertical	
LH ₂ Barrel	Horizontal	From North
SSV Overall	Horizontal	From North
SSV Overall	Horizontal	From East
LO ₂ F/L Bracket & Bellows	Vertical	XT-1973
LO ₂ F/L Bracket	Vertical	XT-1871
LO ₂ F/L Bracket	Vertical	XT-1623
LO ₂ F/L Bracket	Vertical	ST-1377 & XT-1129
LO ₂ F/L Bracket & Bellows	Vertical	XT-1129 & XT-1106 from SE
LO ₂ P/L & C/T	Vertical	From SE

600 MM PHOTOS - 255 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
GO ₂ Vent Ducts	1/30	Contingency

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

STARS, 101

Table 80-2 Final Inspection Team - Telephotos

600 MM PHOTOS - 215 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
-Y GO ₂ Seal	1/30	
-Y Bipod Ramp	1/30	Contingency
Jack Pad C/O's	1/4	Difficult if windy
LO ₂ F/L	1/15	
-Y Vertical Strut (Crack)	1/30	

600 MM PHOTOS - 195 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
-Y Bipod Ramp	1/30	Contingency

600 MM PHOTOS - 135 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
LH ₂ UMB	1/30	
-Y Vertical Strut (Crack)	1/60	
LO ₂ F/L Bellows	1/15	Contingency

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-2 Final Inspection Team - Telephotos

600 MM PHOTOS - MLP

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
LH ₂ UMB	1/30	From West
LH ₂ UMB	1/30	From NW
LH ₂ UMB	1/30	From East
LH ₂ UMB Actuator C/O	1/15 or 1/30	From North standing next to water pipe
LO ₂ UMB	1/5	Lower Inboard
LO ₂ UMB	1/8	Inboard
LO ₂ F/L Bracket & Bellows	1/15	One photo to include XT-1978 & XT-1973
LO ₂ F/L Bracket	1/15	XT-1871
LO ₂ F/L Bracket	1/15	XT-1623
LO ₂ F/L Bracket	1/15	XT-1377
LO ₂ F/L Bracket	1/30	One photo to include XT-1129 & XT-1106
LO ₂ F/L Bracket	1/30	From SE corner; One photo to include XT- 1129 & XT-1106
Jack Pad C/O's	1/15	From SE corner
Ice Frost Ramps or Pal Ramps	1/15 or 1/30	Contingency
LH ₂ UMB Inboard	1/15	From East
+Y Longeron	1/15 or 1/30	Contingency
-Y Longeron	1/15	Contingency

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ Tank	Vertical	35-70 mm	
GO ₂ Vent Ducts	Horizontal	35-70 mm	

WIDE ANGLE PHOTOS - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Overall GH ₂ Vent Line	Horizontal	35-70 mm	
Orbiter Nose, ET -Y Side	Horizontal	35-70 mm	
Orbiter Nose, ET -Y, +Z Side	Horizontal	35-70 mm	From RSS
Forward Half of Vehicle	Vertical	28 mm	From RSS
Entire Orbiter	Vertical	28 mm	From RSS

WIDE ANGLE PHOTOS - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Aft Part of SSV, LH Wing	Vertical	35-70 mm	
Orbiter Fwd Section, Upper LH ₂ Tank	Vertical	35-70 mm	
Bipod, -Y, +Z Intertank Area	Horizontal	35-70 mm	

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Orbiter Aft Section	Vertical	35-70 mm	
Lower LH ₂ Tank & LH SRB	Vertical	35-70 mm	

WIDE ANGLE PHOTOS - MLP

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Overall Orbiter Left Side	Vertical	28 mm	
ET -Y, +Z Quadrant	Vertical	28 mm	
ET -Z Side	Vertical	28 mm	
ET +Y, +Z Quadrant	Vertical	28 mm	
Overall Orbiter Right Side	Vertical	28 mm	
ET Aft Dome	Horizontal	35-70 mm	
-Z Side of LO ₂ T-0; RCS Stinger	Horizontal	35-70 mm	
+Z Side of LO ₂ T-0; RCS Stinger OMS Nozzle	Horizontal	35-70 mm	
-Z Side of LH ₂ T-0; RCS Stinger	Horizontal	35-70 mm	
+Z Side of LH ₂ T-0; RCS Stinger OMS Nozzle	Horizontal	35-70 mm	
Overall SSME Cluster	Horizontal	50 mm	-Y Side
SSME No. 2	Horizontal	50 mm	
SSME No. 1, -Z Side	Horizontal	50 mm	
SSME No. 3	Horizontal	50 mm	
Overall SSME Cluster	Horizontal	50 mm	+Y Side

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - MLP (continued)

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ UMB Area	Horizontal	35-70 mm	
LH ₂ UMB Area	Horizontal	35-70 mm	
ET/ORB UMB & ORB Lower Surface	Horizontal	28 mm	From under ET

*** End of Table 80-2 Final Inspection Team - Telephotos ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
GO ₂ Vent Ducts	TELE	Horizontal	

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
-Y Bipod Ramp	Horizontal	TELE	From RSS
LO ₂ P/L Ice/Frost Ramps	Vertical	TELE	From RSS; 2 photos required
GO ₂ Seal/Hood	Horizontal	TELE	From RSS
GUCP	Vertical	TELE	
Fwd Half of SSV	Vertical	28 mm	From RSS
Entire Orbiter	Vertical	28 mm	From RSS

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
-Y Bipod Ramp & Jack Pad C/O's	Horizontal	TELE	

11-25-02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

STARS, 154

Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	TELE	
Orbiter Aft Section	Vertical	35-70 mm	

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - MLP DECK

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	TELE	From West
ET Aft Dome	Horizontal	TELE	
Aft Hard Point Closeout	Vertical	TELE	
LH ₂ Tank	Horizontal	TELE	From North
LO ₂ Tank	Horizontal	TELE	From North
LO ₂ Tank	Horizontal	TELE	From East
LO ₂ F/L Bracket Bellows	Horizontal	TELE	XT - 1978 & XT - 1973
LO ₂ F/L Bracket	Horizontal	TELE	XT - 1871
LO ₂ F/L Bracket	Horizontal	TELE	XT - 1623
LO ₂ F/L Brackets	Horizontal	TELE	XT - 1377 & XT - 1129
LO ₂ F/L Brackets & Bellows	Horizontal	TELE	XT - 1129 & XT - 1108; from SE
LO ₂ P/L & C/T	Horizontal	TELE	From SE
Overall Orbiter Left Side	Vertical	28 mm	
ET -Z Side	Vertical	28 mm	
Overall Orbiter Right Side	Vertical	28 mm	
Overall SSME Cluster -Y Side	Horizontal	28 mm	

11-25-0

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - MLP DECK (continued)

Overall SSME Cluster +Y Side	Horizontal	28 mm	
ET/Orb UMB & Orbiter Lower Surface	Horizontal	28 mm	From under ET

*** End of Table 80-3 - Reduced Final Inspection Team Photos ***

*** End of Operation 80 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

OPERATION 90 LO₂/LH₂ Drain Monitoring

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

NOTE

This operation is contingent upon progression of launch countdown and is performed after start of cryo (LO₂/LH₂) loading and subsequent launch scrub, FRF, or WCDDT.

Operation Not Performed: N/A

NOTE

This operation monitors the External Tank external surfaces during LO₂/LH₂ drain operations from time of detanking until 1.5 hours after LO₂/LH₂ low level sensors read dry via OTV 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171.

Noted requirements satisfied by this operation: OMRS S00E00.021

90-1 Record start date/time (GMT) of LH₂ and LO₂ Tank Drain.

LH₂ Drain Start Date 11/22/02 Time 03:00 GMT

LO₂ Drain Start Date 11/22/02 Time 01:22 GMT

ETM W. Richards Date 11/22/02

11/22/02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

90-2 CVM1 JTV1 223

From start of LO₂ Tank Drain and LH₂ Tank Drain until respective LO₂/LH₂ low level sensors read dry, monitor ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras. No cryogenic liquid or excessive vapors allowed.

ETM

W. Richards
W. RICHARDS

Date

11/22/02

Support: COMM

90-3 Record date/time (GMT) when LO₂/LH₂ low level sensors read dry.

LH₂ Sensors Dry

Date

11/23/02

Time

0420

GMT

LO₂ Sensors Dry

Date

11/23/02

Time

02:56

GMT

ETM

W. Richards
W. RICHARDS

Date

11/22/02

11-25-02

11/25

90-2

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

90-4 CVM1 JTV1 223

Monitor ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras for 1.5 hours after LO₂/LH₂ low level sensors have read dry. No cryogenic liquid or excessive vapors allowed. Record date/time (GMT) when monitoring complete.

LH₂ Complete. Date 11/23 Time 0550 GMT

LO₂ Complete Date 11/23/02 Time 0426 GMT

ETM W. Richards Date 11/23/02
W. RICHARDS Support: COMM

WC
150
USA
NOV 8 '02

Dev 90
01
SPC 744
11/23/02

SEE DEV FOR STEP 90-4.1

90-5 Completion of this operation satisfies noted requirements.

OMRSD S00E00.021 USA
VM 141

90-6 Operation - LO₂/LH₂ Drain Monitoring complete.

*** End of Operation 90 ***

OMI S6444 J04
APPROVED

100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918

OPERATION 100 Console Securing

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

100-1

CTIF	TBC	136
TBC	CTC	232

OTV support for ET thermal protection system evaluation no longer required.

100-2

CTIF JYVR 138

Perform the following:

- 1. Turn off video recorders.**
- 2. Remove tape cartridges.**
- 3. OTV support no longer required.**

Support: COMM

100-3

CTIF CVM1 222
CVM2

**Secure consoles by setting all monitors to "Off" position.
Report completion.**

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

Perform next step only after a successful launch.

100-4

CTIF

Remove photo processing laptop computer from Firing Room.

Not Performed: *Richards*
W. R. D.
11-23-02

100-5

CTIF	TBC	136
TBC	CTC	232

Firing Room 2, ice frost monitoring area securing complete.

100-6

Operation 100 - Console Securing complete.

ETM *Richards*
W. R. D. Date 11-23-02

*** End of Operation 100 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SECRET, 1000

OPERATION 110 Summary Tape

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Observations/concerns observed during count are typically recorded on the summary tape real-time (trouble tape).

110-1 CICE

After launch or launch scrub, prepare a summary tape to include observations/concerns noted during count.

110-2 Operation Summary Tape complete.

ETM R. Brewer Date 11-22-02
BREWER

*** End of Operation 110 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SEARS, 100

OPERATION 120 Post Drain Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 2.0

NOTE

Post drain walkdown performed only after start of cryo (LH₂/LO₂) loading and subsequent launch scrub.

Operation Not Performed: N/A

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel shall wear **hardhats** and **flame retardant coveralls** while performing post drain walkdown.

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

Post drain walkdown performed in support of a 24 hour scrub turnaround is typically coincident with the L-20 hour pre-launch walkdown for the ensuing launch attempt.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(4)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(1)
SFOC Safety	(1)

- 120-1** NASA Lead ET Mechanical Systems Engineer (PH-H) verify essential personnel on station, properly attired, and ready to proceed with post drain walkdown.

Essential Personnel

NASA Engineering (PH-H)	1
SFOC Engineering (ETM)	1

11-25-02

615

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

NOTE

"Hands-on Investigation" is applicable only to those areas which are not understood or fully defined and which cannot be adequately evaluated otherwise.

120-2 Perform post drain walkdown as follows:

1. **Visually inspect** ET TPS exterior surfaces after detanking and warm-up (approximately T + 4 hours after drain is initiated) from the MLP, FSS, and RSS as access permits.
2. **Perform hands-on investigation** of all areas suspected of violating Doc: NSTS 08303 (LI) NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA (LI)

OMRSD S00E00.031 *USA 1st*

3. **Photograph** any vehicle / facility concerns observed.

SPC No. 511/20

Disc/Frame Nos: 1-41

120-3 Walkdown complete. All discrepancies identified. No constraints to continue. **Forward** description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

PH-H *[Signature]* ^{SPEECH} Date 11-23-02
ETM *[Signature]* ^{Richards} Date 11-23-02

120-4 Operation Post Drain Walkdown complete.

*** End of Operation 120 ***



03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

OPERATION 130 Post Launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

NOTE

Do not perform this operation after launch scrub.

Operation Not Performed:

ME
08

11-22-02

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a safety harness with a lanyard secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel participating in walkdown shall wear hardhats and flame retardant coveralls.

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(3)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(2)
SRB ELE	(1)
Thiokol-LSS	(1)
SFOC Safety	(1)
Pad Mgmt Rep	(1)

2/18

13/50

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

- 130-1 NASA (PH-H) verify following personnel on station, properly attired, and ready to proceed with post launch walkdown.

Essential Personnel		
NASA	PH-H	1
SFOC	ETM	1

NOTE

Post Launch Walkdown must be performed prior to washdown and Pad being opened for normal work.

- 130-2 Perform Post Launch Walkdown as follows:

1. Ref Table 130-1, **visually inspect** post launch pad/area to identify any lost flight or ground systems hardware and debris sources.
2. Ref Table 130-2, **document/SIMS photograph** launch PAD area configuration.

Description: Post Launch Walkdown

141
VM
USA

OMRSD S00U00.010-1

SPC No. _____

Disc/Frame Nos: _____

- 130-3 Walkdown complete. Debris sources and lost flight hardware identified. No constraints to continue. **Forward** description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

PH-H _____ Date _____

ETM _____ Date _____

- 130-4 Operation - Post Launch Walkdown complete.

DEC 4 02

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SEARS, J02

Table 130-1 Post Launch Walkdown Inspection Areas

Record mission info, PAD, date, and time:

STS _____

PAD _____

Date _____

Time _____

SRB Hold-down posts (HDP)

Inspect for damage, stud hang-up Epon shim material, ordnance fragments, doghouse blast covers, erosion, missing hardware, debris. Record Results:

MLP Deck

SRB aft skirt purge lines
SRB T-0 umbilicals
Tail service masts (TSM's)
MLP deck

195 Ft Level

Orbiter access arm (OAA)

NIP

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

Table 130-1 Post Launch Walkdown Inspection Areas

215 Ft Level - GH2 Vent Line/GUCP

Latch position
Loose cables
Damage from SRB plume
Damage to the QD

255 Ft Level - GO₂ Vent Arm, Ducts, Hood

Seals
Hood windows, doors, latches

Fixed Service Structure (FSS)

Cable tray covers
Signs
Hydraulic leaks
Slidewire baskets

PAD Apron/Acreage

Vehicle hardware and/or flight TPS materials
Facility debris

Table K-1 PAD Apron/Acreage Items

<u>Description</u>	<u>Location</u>

*** End of Table 130-1 - Post Launch Walkdown Inspection Areas ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002
1000

Table 130-2 Post Launch Photos (MLP, FSS, PAD, Apron, Pad Acreage)

MLP 0-level

- 1 Ea HDP No. 1, 2, 5 & 6 (HDP shoe and Epon shim)
- 1 Ea HDP No. 3, 4, 7 & 8 (blast cover down to HDP base)
- 1 Ea SRB T-O umbilical
- 1 Ea overall view SRB exhaust cutouts\

Any unusual or debris-related damage to the facility; sound suppression water pipes, TSM's cracks in MLP deck, witness panels, handrails, etc.

Any flight hardware debris (tiles, SRB ordnance fragments)
Any facility debris (nuts, bolts, cable tray covers, etc.)

FSS

Close-ups of GUCP and latching mechanism
Overall views of GO₂ vent hood/ducts, if damaged
Any flight hardware or facility debris
Any unusual or debris-related damage to the facility

PAD Apron/PAD Acreage

Any flight hardware or unusual facility debris objects

Any unusual or debris-related damage to the PAD (such as missing brick in the flame trench), perimeter fence, etc.

***** End of Table 130-2 - Post Launch Photos (MLP, FSS, PAD, Apron, Pad Acreage) *****

***** End of Operation 130 *****

NIP



03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SPRMS, 2002

OPERATION 140 Film Review

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

This operation may be not performed after launch scrub.

Operation 140 Not Performed:

ME
08

11-23-02

NOTE

Analysis of Pad Debris Inspection Results determines priority for film review. All critical film (as determined by the Debris Team) must be reviewed as soon as possible after launch and no later than 36 hours prior to entry (of the Orbiter into the earth's atmosphere).

140-1 Review and analyze all engineering launch (and flight) film to:

- Identify any debris damage to the SSV
- Identify flight vehicle or ground system damage that could affect Orbiter flight operations of future SSV launches.

USA
141

OMRSD S00U00.011-1

ETM N/A Date N/A

140-2 Operation - Film Review complete.

ETM N/A Date N/A

*** End of Operation 140 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002

OPERATION 145 IR Camera Removal

Shop: PH-H
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 2.0

WARNING

Hard hats required on the Pad when SSV is not present.

CAUTION

Exercise care to avoid dropping equipment, fasteners, etc from RSS roof to prevent damage to equipment or injury to personnel. All tools must be tethered.

NOTE

IR Camera removal from RSS Roof site may be not performed in launch scrub turnaround scenarios.

145-1 Remove IR camera at RSS Roof Site as follows.

1. Remove fasteners (2 pl) from camera housing front. Retain fasteners for reinstallation when front cover is installed.
2. Install camera housing front cover using previously removed fasteners (2 pl). Tighten fasteners (2 pl) wrench tight.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back cover.

3. **Rotate** camera housing back cover into open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
4. **Disconnect:**
 - Power cable
 - Pan & tilt cable
 - Controller cable
 - OTV coaxial cable
5. **Unlock** spring pin at lower, left to release IR camera Unit in camera housing. **Remove** IR Camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR Camera Unit during removal.
6. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by reinstalling bolts/flat washers (20 pl). **Tighten** bolts wrench tight.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002, 1:00

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear **N-Dex nitril gloves** and **chemical splash goggles**. When working at eye level or above wear a **face shield** over goggles.

WS002.a 05-22-01

7. **Clean** IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol.
8. **Route** IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H _____ Date _____
USA ETM _____ *N* *A* _____
Date _____

Not Performed:

ET/05

NOV 25 04

NOTE

IR Camera removal from Camera Site 2 may be not performed in launch scrub turnaround scenarios.

145-2 Remove IR camera from Camera Site 2 as follows.

1. **Remove** bolt(s) from camera housing front. **Retain** bolt(s) for reinstallation when front cover is installed.
2. **Install** camera housing front cover using previously removed bolt(s). **Tighten** bolt(s) wrench tight.



WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back cover.

3. **Loosen** screws (8 pl) securing camera housing back cover using Phillips screwdriver. **Rotate** camera housing back cover to open position. **Retain** bolts/washers for reinstallation.
4. **Disconnect:**
 - Power cable
 - Pan & tilt cable
 - Controller cable (2 pl)
 - OTV coaxial cable
5. **Unscrew** set screw(s) at lower, left/right to release IR camera Unit in camera housing. **Remove** IR camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR camera Unit during removal.
6. **Coat** camera housing back cover O-ring with a single coat of (1) tube/jar 6505-00-133-8025 Petroleum Jelly, Vaseline (or equivalent) .
7. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by installing screws (8 pl). **Tighten** screws wrench **tight** using Phillips screwdriver.

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

03-15-2002, 1457

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear **N-Dex nitril gloves** and **chemical splash goggles**. When working at eye level or above wear a **face shield** over goggles.

WS002.a 05-22-01

8. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol .
9. Route IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H _____ Date _____

USA ETM _____ Date _____

Not Performed: W/O
71-22-02

SPC 882 Dev. 145
NOV 27 02 No. 02
NOV 27 02
SPC 882
NOV 19 02 Dev. 145
No. 01
see dev

*** End of Operation 145 ***

03-15-2002
APPROVED

OMI S6444 J04
APPROVED

SPRINT, 100

OPERATION 150 Final Report

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

This operation may be not performed after launch scrub.

ME
08

Operation 150 Not Performed:

11-23-02

- 150-1 Assemble final report by attaching following reports to this OMI.
Reference each to this step.

Post Launch PAD Assessment
SRB Assessment
Launch Film Review
Launch Day Video Review
Orbiter Landing Assessment
ET Separation Review

- 150-2 Final report assembly complete.

ETM N/A Date N/A

- 150-3 Operation - Final Report complete.

*** End of Operation 150 ***

```

*****
*      PROGRAM PRA120 SELECTION CRITERIA      *
*-----*
*      RPT TYPE: IPR                          *
*      PR GROUP:                               *
*      WORK AREA CD:                          *
*      PR ELEM CD:                            *
*      STS NO:                                *
*      Starting RPT DT: 11/25/02              *
*      Ending RPT DT: 11/25/02               *
*      LRU or Non-LRU: B                     *
*      PRACA EFF CD:                          *
*      EICN:                                  *
*      RPT STATUS: OP                         *
*      DETECTED DURING: S6444                *
*-----*
*      Sorted by DETECTED DURING, PR ELEM CD, and EICN *
*****

```

SEP 25 1993

TCN 3054167
 36444



DATE: 12/04/02 21:20
REPORT: PRA1200A

PROBLEM REPORTING AND CORRECTIVE ACTION SYSTEM
PROBLEMS BY DETECTING

PAGE: 1

*
* NO DATA FOUND ON THE DATABASE FOR THE SELECTED PARAMETERS *
*

*
* END OF REPORT *
*

372, 373

TEN 3054167
\$6444

DEC 4 0

DEVIATION INDEX

HAD NO.

☒ PERMANENT ☐ TEMPORARY ☐ TEMP RECYCLE

S6444 REV: J CHG:04 (QMI)

DATE/TIME: 06/06/2002 07:56:26

TASK NO./SEQ. NO. 90

[illegible]





United Space Alliance

TOP/WAD Deviation

Dev No. <u>90/01</u>		DILS No. <u>98/24</u> (5)		Page 1 of 1	
TOP/WAD No. S6444		REV/CHG/VER J04		Cause Code Requesting or Causing Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	
		<input type="checkbox"/> In Family <input type="checkbox"/> Out of Family <input checked="" type="checkbox"/> NMA		Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite J 20	
First Use <input type="checkbox"/> SRB BI- <input checked="" type="checkbox"/> ET 093 <input type="checkbox"/> GSE <input type="checkbox"/> STS-					
Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT					
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE				<input checked="" type="checkbox"/> Internal Review Req.	
Contractor OPR <u>R. Brewer</u> <u>06-04-02</u>		Contractor Test Conductor <u>SECH</u> <u>06-04-02</u>		Gov't OPR <u>DP</u> <u>14-H2</u> <u>06-04-02</u>	
Contractor Test Project Engineer		Other <u>SECH</u> <u>06-04-02</u>		Gov't Project Engineer	
Contractor Safety		Other		Gov't Test Director or Contractor Chief TC	

Page Number: 90-3 Step Number: 90-4

Add the following new step:

90-4.1 **Monitor** the ET GOX Vent Land area after GOX Vent Hood retraction using cameras no. 013/113, 060/160, 062/162, 068/168 and 069/169 for potential Topcoat Paint/TPS damage. Record results below.

Results Nothing seen ON Seal or NOSEcone
ETM W. A. Richards Date 11/22/02

Originator (print) <u>R. Brewer</u>	SPDMS ID <u>ZQ6345</u>	Phone <u>1-4429</u>	Organization <u>ETM</u>	Date <u>06/04/2002</u>	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
--	---------------------------	------------------------	----------------------------	---------------------------	---



☐ PERMANENT ☒ TEMPORARY ☐ TEMP - RECYCLE

56444-J04

145

DEC 4 1976



3054167

TOP/WAD Deviation

TOP/WAD No. S6444		REV/CHG/VER J04	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family <input type="checkbox"/> NMA	Cause Code Requesting or Causing Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-113	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT	Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input type="checkbox"/> Internal Review Req.			
Contractor OPR <i>R Brewer 11-19-02</i>		Contractor Test Conductor		Gov't OPR <i>H. Olin PH-HZ 11/19/02</i>	
Contractor Test Project Engineer		Other <i>SE Check Tom Ford 11-19-02</i>		Gov't Project Engineer	
Contractor Safety		Other		Gov't Test Director or Contractor Chief TC	

Page Number: 145-5 Step Number: 145-⁰9-2

After this step, add the following new steps:

145-3 Post Launch of SRBs:

At Hanger "AF", during open assessment, document / photograph as required.

SPC No. _____ Disc / Frame No. _____

PH-H _____ Date _____

145-4 Post Landing Orbiter / Runway Inspection:

1. Photograph debris and any flight hardware found during Orbiter post landing debris walkdown.

2. Photograph any anomalies found during Orbiter post landing debris inspection and TPS damage mapping.

SPC No. _____ Disc / Frame No. _____

PH-H _____ Date _____

ETM _____ Date _____

Originator (print) R. Brewer	SPDMS ID ZQ6345	Phone 1-4429	Organization ETM	Date 11/19/2002	<input type="checkbox"/> Perm <input checked="" type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
--	---------------------------	------------------------	----------------------------	---------------------------	---

Pen and Ink Change Record

REVISION		EFFECTIVITY	
56444 / 504		BI-113, ET-113	
Tracking Number	Page	Seq/Op - Step	Eng Approval
02-FR3-070902	60-8	Table 60-1	
Add Camera 063/163 Spec. features 5-30-02			
SRB AND ORBITER 12M26 IN VIEW CONFIRMED 5/24/02			
FOR LH2 FIRE DETECTION SYSTEM (BUTCHER PAPER)			

Tracking Number	Page	Seq/Op - Step	Eng Approval
-----------------	------	---------------	--------------

Tracking Number	Page	Seq/Op - Step	Eng Approval
-----------------	------	---------------	--------------

Tracking Number	Page	Seq/Op - Step	Eng Approval
-----------------	------	---------------	--------------

Tracking Number	Page	Seq/Op - Step	Eng Approval
-----------------	------	---------------	--------------